

OPERATING SUMMARY

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EGANVILLE

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EGANVILLE
WATER POLLUTION CONTROL PLANT

and

WATER SUPPLY SYSTEM

MINISTRY OF THE ENVIRONMENT

1973 ANNUAL OPERATING SUMMARY



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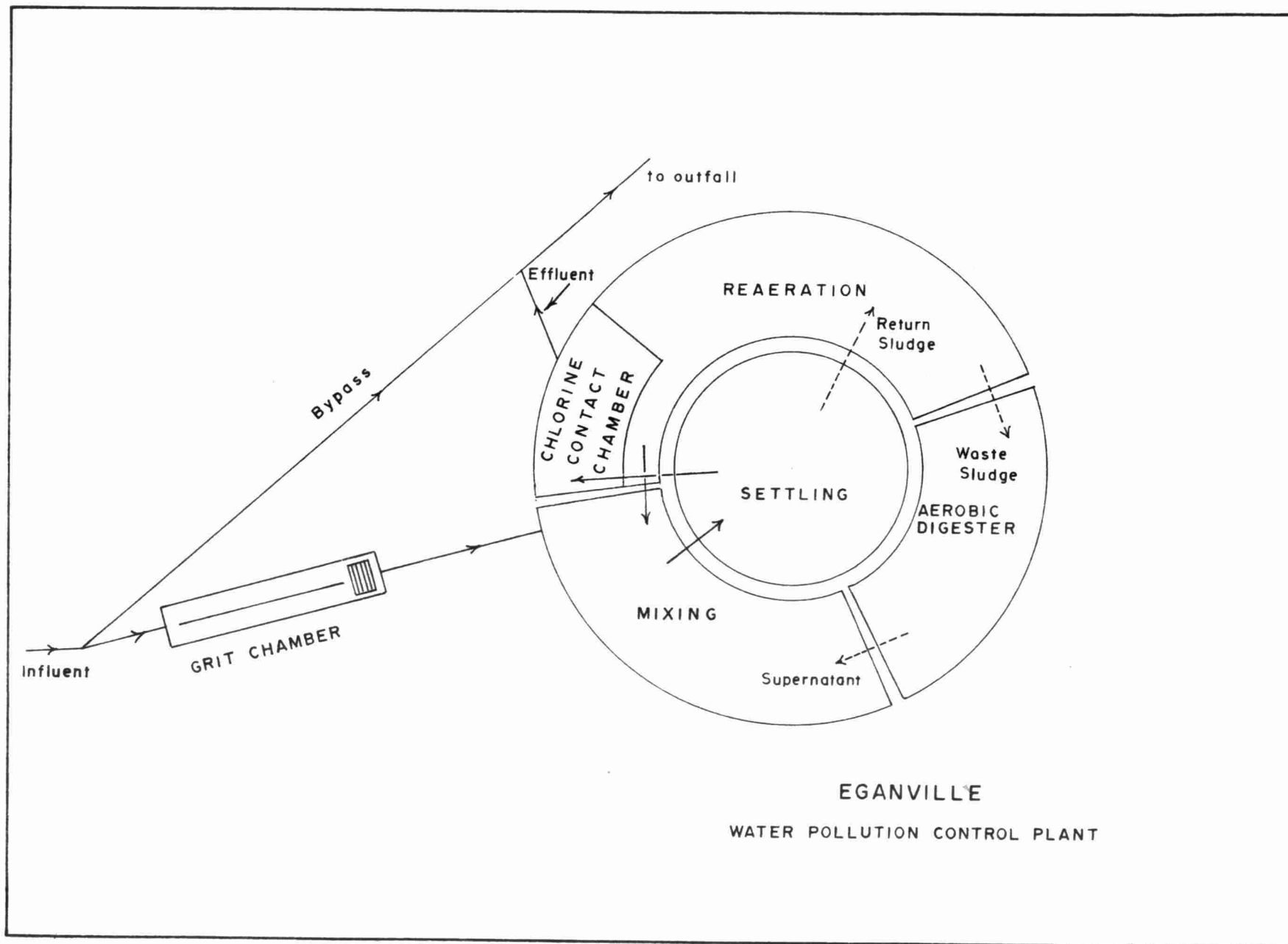
WATER POLLUTION CONTROL PLANT

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WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO. 1-0007-66

TREATMENT Extended Aeration

DESIGN FLOW 0.168 mgd

BOD - Raw Sewage
- Domestic 182 mg/l
- Creamery 154 mg/l

Removal 80%

PRIMARY TREATMENT

Grit Removal

Type: Parallel channels, manually
cleaned
Size: Two 17'4" x 1'2"

SCREENING

Type: Manually cleaned
Size: 1 $\frac{1}{4}$ " openings

COMMINUTION

Type: Aer-o-Flow Type A-12

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air
Size: 83,400 gal
Retention: 12 hours

Air Supply

Type: Dresser type RAI
Size: Three-340 scfm @ 7 psi

SECONDARY SEDIMENTATION

Size: 25'8" dia x 15' (37,500 gal)
Retention: 5.3 hours
Loading: Surface 388 gal/ft²/day
Weir: 1170 gal/ft/day

CHLORINATION

Type: Wallace & Tiernan Type 831
Size: 20 lbs/day

Chlorine Contact Chamber

Size: 3900 gal
Retention: 30 minutes

OUTFALL

OUTFALL

- to Bonnechere River

SLUDGE HANDLING

Digestion System

Type: Aerobic
Size: 56,000 gal

PUMPING STATIONS

North Side

Two Flygt Model CP-3100, 350 US
gpm @ 35' TDH

Water Street

Two Flygt Model CP-3100, 150 US
gpm @ 25' TDH

'73 Review

GENERAL

This was the second full year of operation of the Eganville Water Pollution Control Plant. During the year a workshop/garage was added to the plant control building, doubling the size of the original building. Another set of a new type of diffusers were installed in the aeration tank in an attempt to solve problems with this equipment.

Shock loading from the Eganville Creamery continued to create process problems at the plant and extra work for the plant staff.

Sewage flows have dropped over the past two years as a result of efforts by the municipality to have roof drains, footing drains and basement sump pumps disconnected from the sanitary sewer system.

Four new services were installed, and one extension to the sewer system constructed. One sewer and two service breaks were repaired. The sewer system was checked monthly and flushed as required. Several blockages were rodded and flushed.

PLANT PERFORMANCE AND TREATMENT DATA

Flows for the year totalled 35.0 million gallons. Daily flows averaged 96 thousand gallons as compared to 118 thousand gallons per day in 1972.

The sewage BOD, excluding high-strength spills from the Eganville Dairy, averaged 517 mg/l during 1973 as compared to 308 mg/l in 1972 and 218 mg/l in 1971. The BOD concentration was reduced by an average of 98 per cent to an effluent concentration averaging 8.7 mg/l. In 1972 the effluent BOD concentration averaged 6.1 mg/l.

The sewage suspended solids, again excluding high strength spills from Eganville Dairy, averaged 273 mg/l in 1973, 201 mg/l in 1972 and 109 mg/l in 1971. The suspended solids concentration was reduced by 94 per cent to effluent concentration of 17 mg/l. In 1972 the effluent suspended solids concentration averaged 11 mg/l.

Raw sewage BOD and suspended solids concentrations normally average 150 to 250 mg/l in other sewage treatment plants, assuming no infiltration problems in the sewer system. The increasing strength at Eganville, particularly in 1973, is believed to be attributable entirely to the Dairy as there are no other known potential sources of high strength wastes.

Phosphorus was reduced by 43 per cent in the plant, from an influent concentration averaging 14.6 mg/l to an effluent concentration averaging 8.3 mg/l. As a result of improvements in thickening of the sludge, sludge haulage totalled 88 thousand gallons in 1973, down from 393 thousand gallons in 1972. The plant effluent was disinfected with 1,760 pounds of chlorine.

PLANT LOADING

Flows in 1973 averaged 60 per cent of plant design capacity using the extended aeration process. Excluding high strength spills from Eganville Dairy, the BOD loading averaged 88 per cent of design in 1973, as compared to 66 per cent in 1972 and 50 per cent in 1971, based on a design loading for the extended aeration process of 566 pounds of BOD per day (306 pounds from 1,800 population equivalent plus 260 pounds from Eganville Dairy). Based on an assumed design concentration of 250 mg/l (420 pounds/day) the suspended solids loading averaged 62 per cent of plant design capacity using the extended aeration process in 1973, 57 per cent in 1972 and 34 per cent in 1971.

CONCLUSIONS

In the preparation of this report data accumulated since the startup of the plant was reviewed. Non-representative data reflecting short term high strength spills from Eganville Dairy was deleted in the computation of averages.

The BOD loading on the plant is rapidly approaching its design capacity using the extended aeration process. It will be necessary to convert to the contact stabilization process within the next year or two if this trend continues. This should increase the BOD capacity by approximately 50%, but will make the plant more susceptible to shock loads. We attribute this rapid increase in BOD strength and loading to the Eganville Dairy as there are no other known potential sources of high strength wastes.

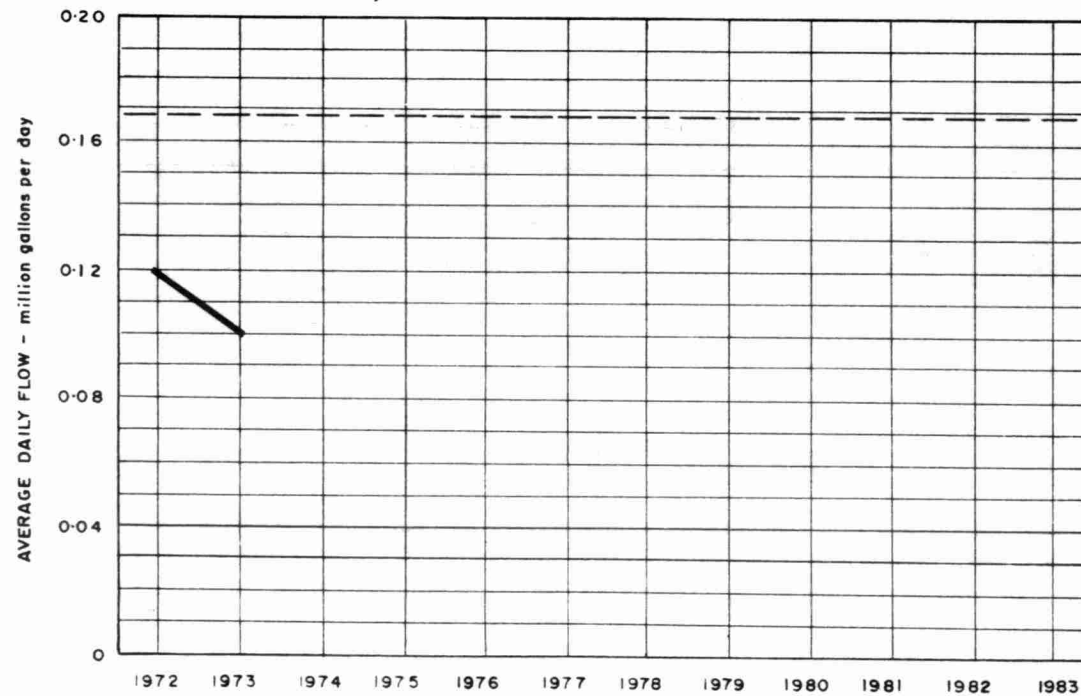
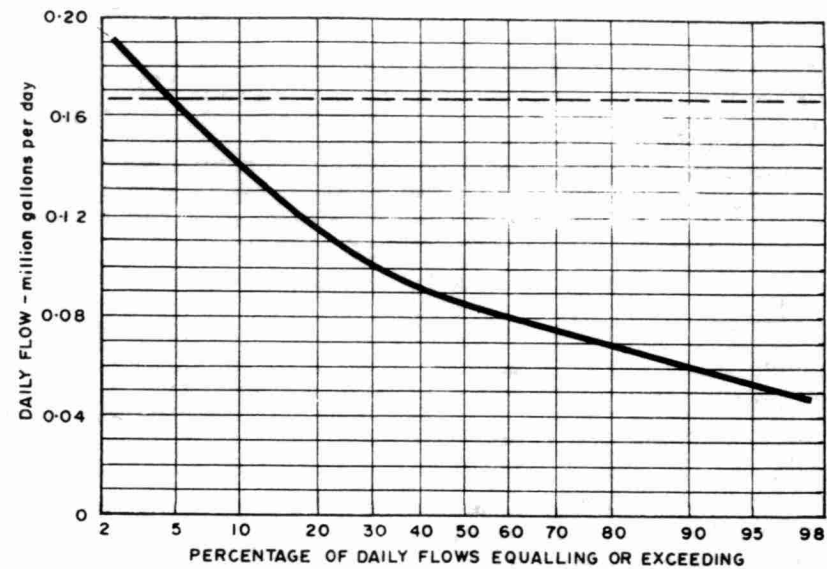
The plant is operating very efficiently and continuing to produce an effluent with BOD concentrations well within Ministry of Environment requirements. As a result of heavy BOD loadings the effluent suspended solids quality has deteriorated to slightly below Ministry requirements.

The process has been upset on numerous occasions ever since startup by spills of high strength waste from the Eganville Dairy. With increasing plant loading it becomes more difficult for the process to recover from these shock loads. The spills have created a considerable amount of extra work for the plant staff. The situation has reached the point where spills can no longer be tolerated.

The plant has been operated since startup by a staff of two men who also operate the Eganville Water Plant and the sewage collection and water distribution systems. The Chief Operator, Basil Hein and his operator Gary Swant are to be commended for high standards of operation and maintenance.

PROCESS DATA

FLOWS

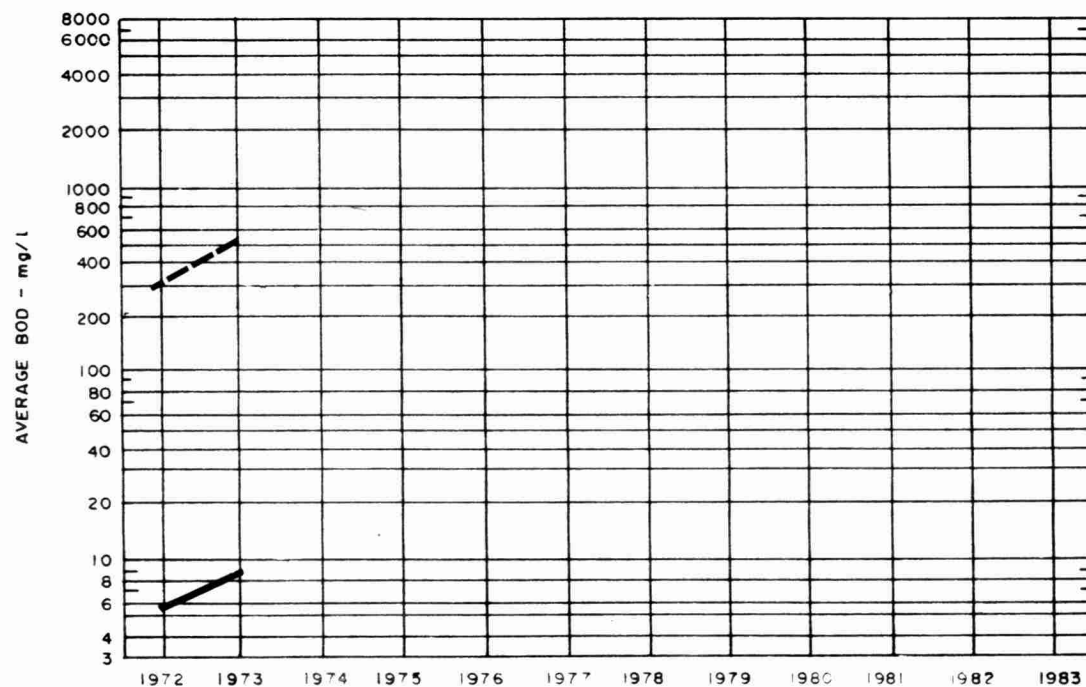
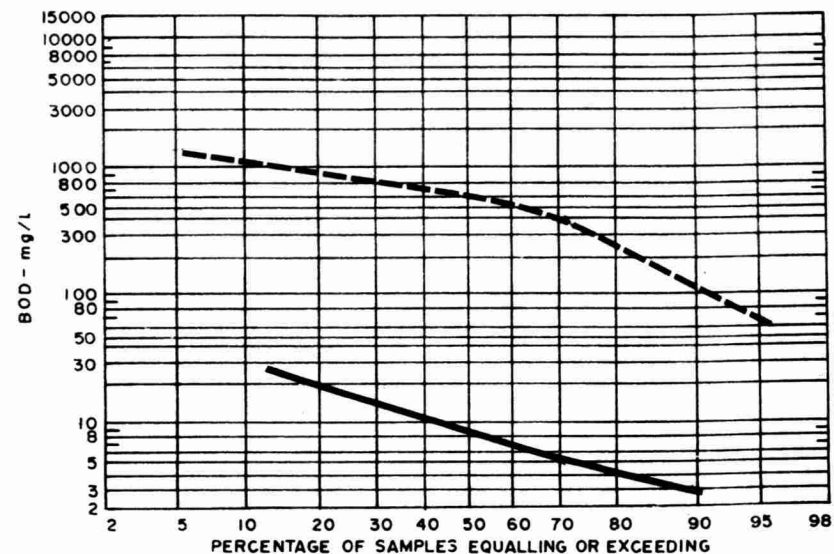


DESIGN CAPACITY - - - - -

PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10 ³ pounds	mg/l	mg/l	%	10 ³ pounds	mg/l P	mg/l P
JAN	2.93	0.09	0.12	500	8	98	12.2	320	20	94	8.8	13.2	8.5
FEB	2.44	0.09	0.11	195	4	97	4.7	130	8	94	3.0	12.5	10.0
MAR	4.63	0.15	0.20	205	17	91	8.7	230	10	96	10.2	10.3	5.0
APR	4.82	0.16	0.29	285	5	98	11.3	200	18	91	8.8	6.8	4.9
MAY	3.70	0.12	0.15	1150	14	98	42.0	435	2	99+	16.0	42.0	8.0
JUNE	3.22	0.11	0.13	810	7	99+	25.9	340	23	93	10.2	18.7	7.7
JULY	2.40	0.08	0.09	980	9	99	23.3	470	35	93	10.4	27.3	11.5
AUG	2.46	0.08	0.09	370	8	98	9.0	190	20	89	4.2	12.0	14.0
SEPT	2.36	0.08	0.10	300	4	99	7.0	160	23	86	3.2	8.5	10.0
OCT	2.21	0.08	0.09	320	2	99	7.0	190	20	89	3.8	9.4	7.7
NOV	1.87	0.06	0.08										
DEC	1.96	0.06	0.08	300	20	93	5.5	190	10	95	3.5	5.6	4.0
TOTAL	35.00	-	-	-	-	-	156.6	-	-	-	82.1	-	-
AVG.		0.10	MAXIMUM 0.29	517	9	98	14.2	273	17	94	7.5	14.6	8.3
No. of Samples	-	-	-	20	19	-	-	20	19	-	-	19	19

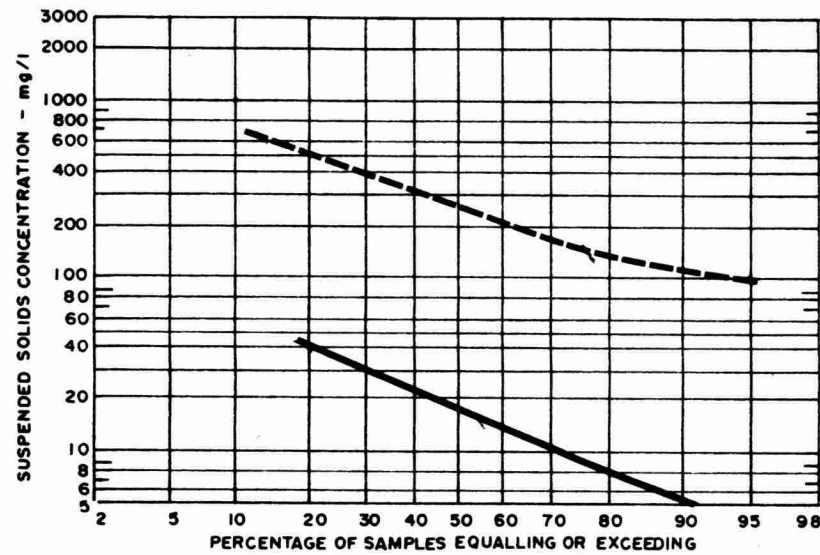
BIOCHEMICAL OXYGEN DEMAND



PLANT INFLUENT - - - - -

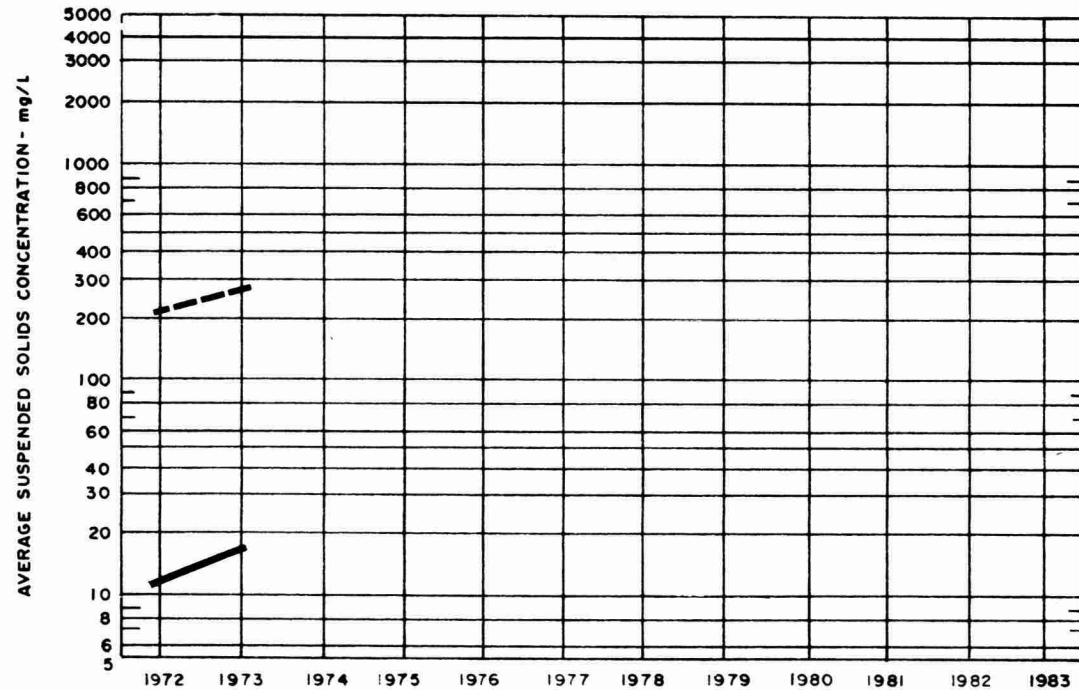
PLANT EFFLUENT _____

SUSPENDED SOLIDS

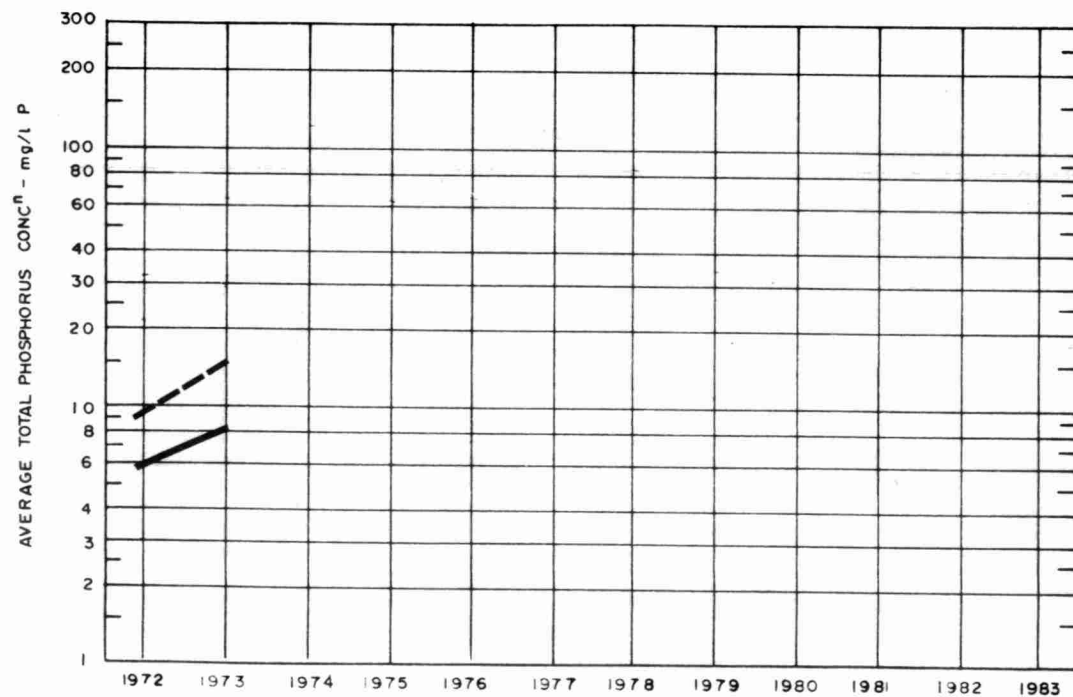
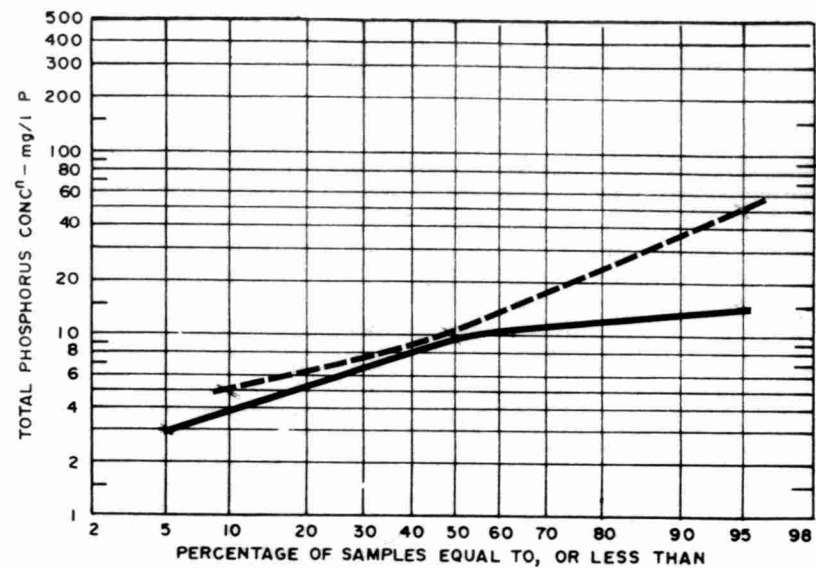


PLANT INFLUENT - - - - -

PLANT EFFLUENT _____



PHOSPHORUS



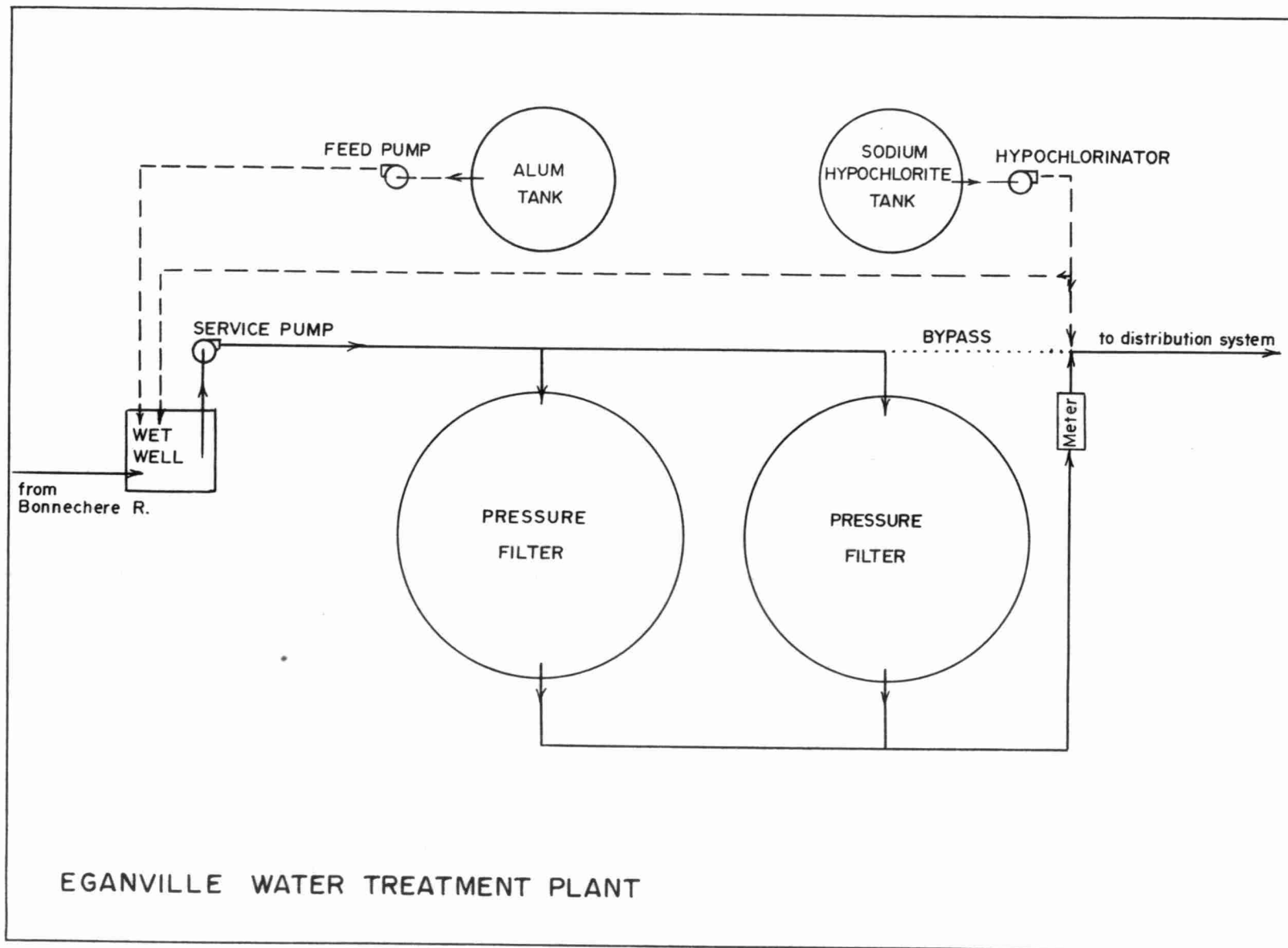
PLANT INFLUENT - - - - -

PLANT EFFLUENT —————

TREATMENT DATA

MONTH	GRIT	CHLORINATION		AERATION			WASTE SLUDGE			AEROBIC DIGESTER			
	QUANTITY REMOVED	Cl ₂ USED	AVG. DOSAGE	MLSS. CONC	F/M	AIR USED	QUANTITY	SUSPENDED SOLIDS	VOL. SOLIDS	QUANTITY REMOVED	SUSPENDED SOLIDS	VOL. SOLIDS	AMOUNT HAULED
	cubic feet	pounds	mg/l	mg/l	day ⁻¹	$\frac{1000 \text{ ft}^3}{\text{lb BOD}}$	10 ³ gallons	mg/l	%	10 ³ gallons	mg/l	%	cubic yards
JAN	14	124	4.2	5300	0.06			6200			6500		
FEB	11	97	4.0	5200	0.02			7070			10700		
MAR	23	198	4.3	3900	0.05			6100			9100		
APR	9	155	3.2	4400	0.06			7200			7400		
MAY	19	150	4.1	3500	0.29			8300			6500		
JUNE	13	186	5.8	6500	0.10			8200		9.0	7000		53
JULY	12	118	4.9	5800	0.10			6300		10.0	8000		59
AUG	6	160	6.5					8600		12.0	10500		71
SEPT	16	146	6.2	5900	0.03			4000		13.0	14600		77
OCT.	11	152	6.9	5000	0.03			7700		14.0	16200		83
NOV	9	144	7.7	6900				4100		12.0	6100		71
DEC	7	130	6.6	5000	0.03			9000		18.0	8700		107
TOTAL	150	1760	-	-	-	-		-	-	88.0	-	-	521
AVG.	4.3 cu. ft/mil gal	147	5.0	5200	0.08			6900		13.0	9300		74

WATER SUPPLY SYSTEM



DESIGN DATA

PROJECT NO. 6-0093-61

TREATMENT Coagulation and Filtration

FILTERS

Type: Pressure, sand.
Size: 84 inch dia

SOURCE

- Bonnechere River

DISTRIBUTION

6" and 8" dia pipe

PUMP

One Canada Pump 167 igpm @ 210' TDH

'73 Review

GENERAL

The water consumption dropped slightly during 1973 as a result of summer use restrictions, monitoring of the distribution system for leaks, and effecting rapid leak repair.

At the water treatment plant, the water distribution pump was overhauled and a footing drain system was installed.

Five new water services, and one extension were provided and one water main break was repaired.

EXPENDITURES

The cost of operating the water system in 1973 was \$8,167, a reduction from \$10,319 in 1972. The cost of treating and distributing one million gallons of water averaged \$360.

PLANT PERFORMANCE AND TREATMENT DATA

Flows for the year totalled 22.75 million gallons or 62 thousand gallons per day as compared to 65 thousand gallons per day in 1972 and 78 thousand gallons per day in 1971.

A total of 1883 pounds of alum was used to coagulate the raw water to improve the filtration effectiveness, and a total of 763 gallons of sodium hypochlorite was used to disinfect the treated water before pumping it into the distribution system.

A very high wauality water resulted with only 3 of the 218 plant effluent and distribution system samples showing any sign of incomplete disinfection.

PLANT LOADING

Flows during 1973 averaged 25 per cent of maximum plant capacity, limited by the filters, of approximately 250,000 gallons per day. The maximum day flow was 46 per cent of maximum plant capacity. However, the maximum plant capacity is presently limited by the size and condition of the distribution pumps, and by the fact that there is no reservoir of water which can be drawn upon for peak requirements, and refilled during periods of low flow.

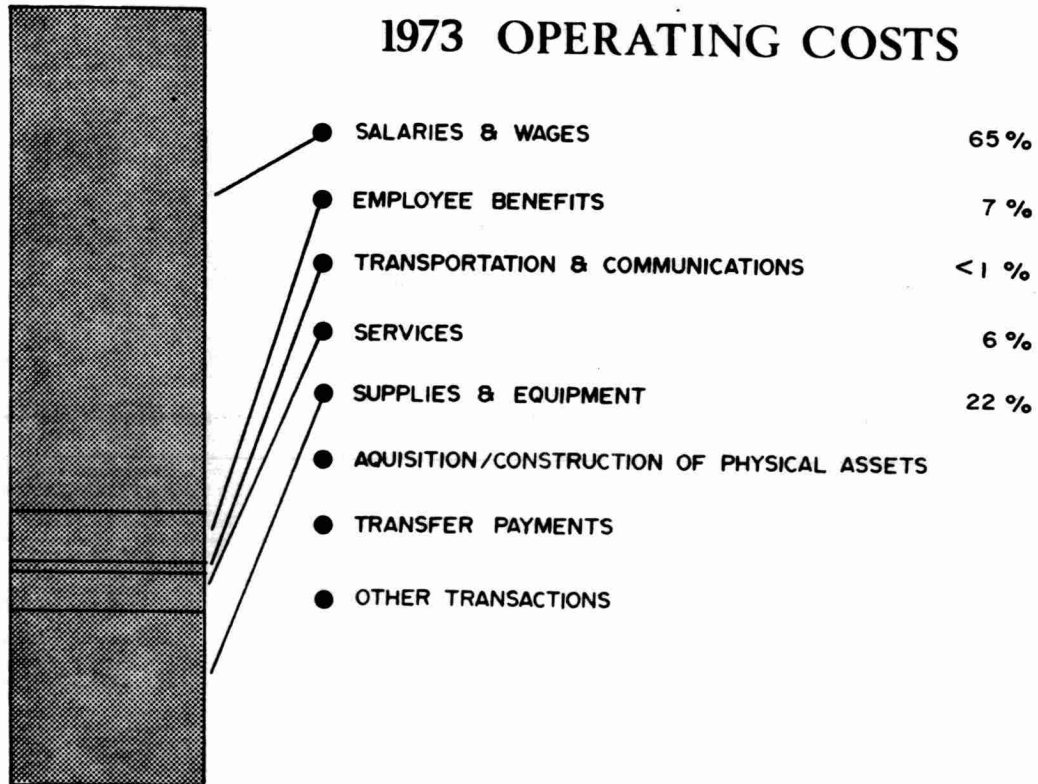
CONCLUSIONS

The elevated tank to be constructed in 1974 plus modifications to the distribution pumps and piping arrangement in the plant will each improve the plant capacity. When this work is completed low-pressure problems during periods of peak flow will be alleviated, and maintenance of the plant components will be possible without interfering with the supply of water.

The plant staff have worked conscientiously to keep the system in good condition and provide a high standard of service.

ANNUAL COSTS

1973 OPERATING COSTS



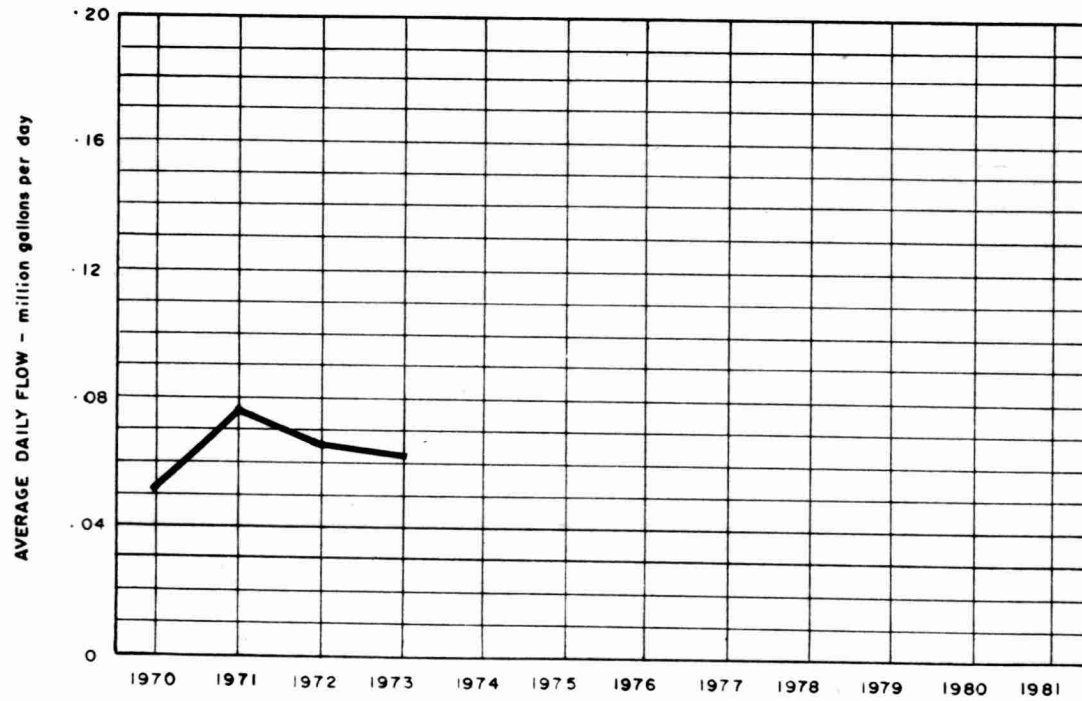
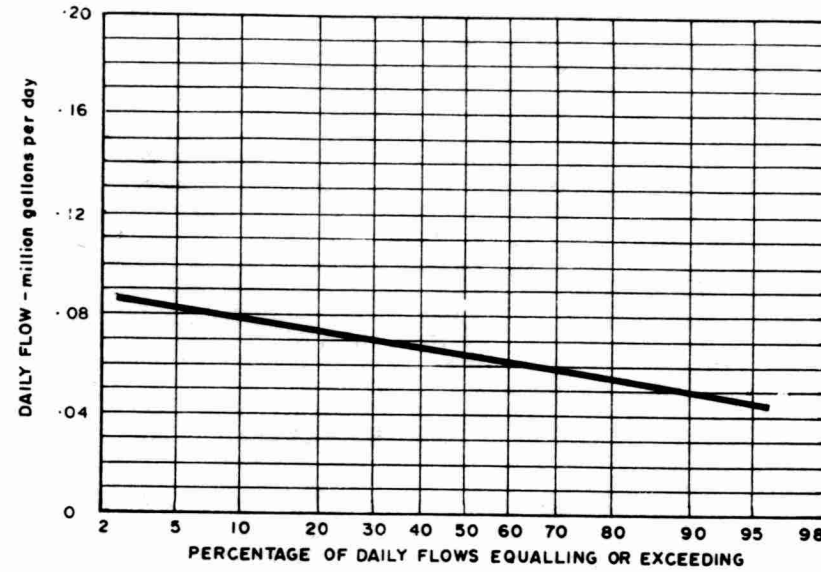
YEARLY OPERATING COSTS

YEAR	WATER TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS
			cents per 1000 gal.
1972	24.17	\$ 10,319	43
1973	22.75	8,168	36

OPERATING EXPENDITURES

SALARIES AND WAGES	<u>\$ 5300</u>
EMPLOYEE BENEFITS	<u>530</u>
TRANSPORTATION & COMMUNICATIONS	<u>48</u>
SERVICES	<u>520</u>
SUPPLIES AND EQUIPMENT	<u>1770</u>
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	<u>0</u>
TRANSFER PAYMENTS	<u>0</u>
OTHER TRANSACTIONS	<u>0</u>
TOTAL	<u>\$ 8168</u>

PROCESS DATA FLOWS



DESIGN CAPACITY 0.25

PLANT PERFORMANCE

MONTH	FLOWS			ALUM		CHLORINATION			TEMPERATURE	
	TOTAL PLANT OUTPUT million gallons	AVERAGE DAILY FLOW million gallons	MAXIMUM DAY'S FLOW million gallons	AMOUNT USED pounds	DOSAGE mg/l	SODIUM HYPOCHLORITE USED gallons	DOSAGE mg/l	RESIDUAL IN PLANT EFFLUENT mg/l	AVERAGE ° F	MAXIMUM ° F
JAN	1.96	0.063	0.080	104	5.3	56	3.4	0.5	27	27
FEB	2.03	0.073	0.087	116	5.7	48	2.8	0.5	27	27
MAR	1.81	0.058	0.071	108	6.0	42	2.8	0.5	29	33
APR	1.65	0.055	0.069	92	5.6	44	3.2	0.5	35	40
MAY	1.84	0.060	0.076	109	5.9	58	3.8	0.5	46	54
JUNE	1.74	0.058	0.071	157	9.0	73	5.1	0.5	63	68
JULY	2.25	0.073	0.116	224	12.0	95	5.1	0.5	70	72
AUG	1.92	0.062	0.104	293	15.0	82	5.1	0.5	69	72
SEPT	1.87	0.062	0.080	252	14.0	80	5.1	0.5	59	76
OCT	1.85	0.060	0.078	192	10.0	67	4.3	0.5	48	54
NOV	1.91	0.063	0.076	165	8.6	51	3.2	0.5	31	40
DEC	1.92	0.062	0.072	187	9.3	67	4.2	0.5	29	30
TOTAL	22.75			1883		763				
AVG.		0.062	MAXIMUM 0.116	5 pounds per day	8.3	2 gallons per day	4.0	0.5	44	MAXIMUM 76

CHLORINATION and DISINFECTION

MONTH	RAW WATER					PLANT EFFLUENT		DISTRIBUTION SYSTEM	
	NUMBER OF SAMPLES HAVING TOTAL COLIFORM ORGANISMS PER 100 ml OF					NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS	NUMBER OF SAMPLES TAKEN	NUMBER HAVING COLIFORM ORGANISMS
	0	1 - 3	4 - 32	33 - 320	> 320				
JAN	5	0	0	0	0	20	0	0	0
FEB	3	0	0	0	0	12	0	0	0
MAR	5	0	0	0	0	20	0	0	0
APR	4	0	0	1	3	20	0	12	0
MAY	3	0	1	1	0	20	0	0	0
JUNE	4	0	0	0	0	14	2	0	0
JULY	5	0	0	0	0	20	0	0	0
AUG	3	0	0	1	0	16	0	0	0
SEPT	1	0	1	1	0	12	0	0	0
OCT	5	0	0	0	2	20	0	0	0
NOV	3	0	0	0	0	16	0	5	0
DEC	3	0	0	0	0	11	1	0	0
TOTAL	44	0	2	4	5	201	3	17	0
AVG.	3 (NOTE - Average shown is the GEOMETRIC MEAN)								

WATER QUALITY

PROPERTY	RAW WATER				TREATED WATER				DESIRABLE STANDARDS
	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	NUMBER OF SAMPLES	AVERAGE	MAXIMUM	MINIMUM	
HARDNESS in mg/l as CaCO_3	11	56	70	46	2	64	66	62	80 - 100
ALKALINITY in mg/l as CaCO_3	11	42	52	36	2	48	48	48	30 - 100
IRON in mg/l Fe	11	0.13	0.20	0.10	2	0.08	0.10	0.05	Less than 0.3
CHLORIDE in mg/l Cl^-	11	6	8	5	2	6	6	6	Less than 250
pH in pH units	11	7.5	7.9	7.3	2	7.5	7.6	7.4	7.0 - 8.5
CONDUCTIVITY in micromhos per cm^3	3	143	155	136	2	138	140	137	

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